

ERRATA

Erratum: "An application of the apertureless scanning near-field optical microscopy: Imaging a GaAlAs laser diode in operation" [Appl. Phys. Lett. 73, 3333 (1998)]

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The conclusions concerning the chemical composition of the double heterojunction (i.e., $\text{Ga}_{0.85}\text{Al}_{0.15}\text{As}/\text{GaAs}/\text{Ga}_{0.85}\text{Al}_{0.15}\text{As}$) given in the letter were not correct. The emitted wavelength of the laser crystal studied in this letter (being equal to $0.78\text{ }\mu\text{m}$, the corresponding composition of the double heterojunction) is, in fact, $\text{Ga}_{0.7}\text{Al}_{0.3}\text{As}/\text{Ga}_{0.85}\text{Al}_{0.15}\text{As}/\text{Ga}_{0.7}\text{Al}_{0.3}\text{As}$. The purpose of this erratum is to provide some additional information to correct this mistake. The double heterojunction GaAlAs laser diode presented in the letter has the following typical composition: $\text{Ga}_{1-x}\text{Al}_x\text{As}/\text{Ga}_{1-y}\text{Al}_y\text{As}/\text{Ga}_{1-x}\text{Al}_x\text{As}$, x and y being the Al molar fraction in the cladding layers and in the active layer, respectively ($y < x < 0.37$). The Al molar fraction in the active layer is adjusted in the $[0-0.28]$ range to obtain the desired emitted wavelength λ ($0.87-0.7\text{ }\mu\text{m}$).¹ In our case, the studied laser diode emits at $\lambda=0.78\text{ }\mu\text{m}$, imposing a y value of about 0.15.¹ In our letter, we claimed that the measured confinement factor of 0.4 leads to a value of Al molar

fraction in the cladding layers of 0.15. In fact, since the active layer also contains Al, the value of 0.15 found is a difference between x and y . Indeed, knowing that both the band gap and the refractive index of a $\text{Ga}_{1-x}\text{Al}_x\text{As}$ alloy vary linearly with x ($0 < x < 0.37$),¹ the optical confinement in the active layer is unchanged if the difference $\Delta = x - y$ stays constant. Therefore, the structures $\text{Ga}_{1-x}\text{Al}_x\text{As}/\text{Ga}_{1-y}\text{Al}_y\text{As}/\text{Ga}_{1-x}\text{Al}_x\text{As}$ and $\text{Ga}_{1-\Delta}\text{Al}_\Delta\text{As}/\text{GaAs}/\text{Ga}_{1-\Delta}\text{Al}_\Delta\text{As}$ (i.e., $\text{Ga}_{0.7}\text{Al}_{0.3}\text{As}/\text{Ga}_{0.85}\text{Al}_{0.15}\text{As}/\text{Ga}_{0.7}\text{Al}_{0.3}\text{As}$ and $\text{Ga}_{0.85}\text{Al}_{0.15}\text{As}/\text{GaAs}/\text{Ga}_{0.85}\text{Al}_{0.15}\text{As}$) would impose the same optical mode dimensions. In conclusion, the measurement, presented in the letter, leads to the following composition of the studied double heterojunction: $\text{Ga}_{0.7}\text{Al}_{0.3}\text{As}/\text{Ga}_{0.85}\text{Al}_{0.15}\text{As}/\text{Ga}_{0.7}\text{Al}_{0.3}\text{As}$.

¹H. C. Casey and M. B. Panish, *Heterostructure Lasers* (Academic, New York, 1978).